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Towards an automated approach to magnetic divertor configuration design — •Maarten Blommaert[1], Wouter Dekeyser[2], Martine Baelmans[2], Nicolas Ralph Gauger[3], and Detlev Reiter[1] — [1]Institute for Plasmaphysics (IEK-4), FZ Jülich GmbH, D-52425 Jülich, Germany — [2]KU Leuven, Department of Mechanical Engineering, 3001 Leuven, Belgium — [3]Center for Computational Engineering Science, RWTH Aachen, D-52062 Aachen, Germany

At present, several plasma boundary codes exist that attempt to describe the complex interactions in the divertor SOL (Scrape-Off Layer). The predictive capability of these edge codes is still very limited. Yet, in parallel to major efforts to mature edge codes, we face the design challenges for next step fusion devices. One of them is the design of the helium and heat exhaust system. Therefore, already now, modern concepts of computational engineering (automated design) are being investigated regarding their conceptual suitability for the edge/divertor design problem. The application of these methods to magnetic field design is studied, using a somewhat reduced plasma-gas continuum flow model and a perturbation approach for the magnetic equilibrium. The aim is to provide enhanced spreading of heat fluxes over the target plates. The methods are applied to a specific example based on a JET magnetic equilibrium and model parameters. For the current model, inner and outer target peak heat loads could be reduced by 48% and 38% respectively. This reduction is mainly achieved by an increased divergence of the magnetic field lines towards the target area.

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